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EXAMINER
PARKER, KENNETH

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 08/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No.	Applicant(s)	
	09/327,713	NISHIOKA, KIMIHIKO	
	Examiner	Art Unit	
	Kenneth A Parker	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 May 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-43,45 and 48-85* is/are pending in the application.

4a) Of the above claim(s) *1-36,45,50-53,57-76 and 79-85* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *37-43,48,49,54-56,77 and 78* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Response to Amendment

The amendment filed 5/19/03 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: The opticalelement having a plurality of an optical element having a plurality of rotationally asymmetric surfaces and one symmetric surface.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 49 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The opticalelement having a plurality of an optical element having a plurality of rotationally asymmetric surfaces and one symmetric surface. This means that the sides are not rotationally symmetric (which would include flat). As applicant did not show this earlier, and one of ordinary skill would not have believed applicant was in possetion of the invention

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 77-78 are rejected under 35 U.S.C. 102(b) as being anticipated by Akiyama et al 6522475.

The reference has a variable optical property element (a zoom system) as below shown in the abstract "A zoom optical system comprises a plurality of optical elements. The plurality of optical elements include a first optical element

having two refracting surfaces and a plurality of reflecting surfaces formed in a transparent body, being arranged such that a light beam enters an inside of the transparent body from one of the two refracting surfaces and, after being successively reflected from the plurality of reflecting surfaces, exits from the other of the two refracting surfaces, and/or a second optical element having a plurality of surface mirrors integrally formed and decentered relative to one another, being arranged such that an incident light beam exits therefrom after being successively reflected from reflecting surfaces of the plurality of surface mirrors, and a third optical element composed of a plurality of coaxial refracting surfaces. In the zoom optical system, an image of an object is formed through the plurality of optical elements, and zooming is effected by varying relative positions of at least two optical elements of the plurality of optical elements"

And a plurality of non-rotationally symmetric surfaces are listed "after being successively reflected from the plurality of reflecting surfaces, exits from the other of the two refracting surfaces, and/or a second optical element having a plurality of surface mirrors integrally formed and decentered relative to one another, being arranged such that an incident light beam exits therefrom after being successively reflected from reflecting surfaces of the plurality of surface mirrors, and a third optical element composed of a plurality of coaxial refracting surfaces" . As the zoom system feeds the mirrors, they become a variable optical property mirror as a system. Also, please note, the "Of the plurality of reflecting surfaces, curved reflecting surfaces are all formed to anamorphic shapes", col. 6, last lines.

Claims 40, 43, 77-78 are rejected under 35 U.S.C. 102(b) as being anticipated by Gelbart 6147789.

The claims are written to :40. An optical apparatus comprising: a variable optical-property mirror having a reflecting surface of a shape wherein the length of one direction is longer than that of the other direction, and said variable optical property mirror is arranged so that the one direction of said reflecting surface coincides with a direction wherein a cross line between said reflecting surface and a plane on which rays incident on and emergent from said variable optical-property mirror lie extends and 43. An optical system, consisting of a rotationally asymmetric surface; and a variable optical-property mirror constructed with a variable shape mirror.

The reference, Gelbart discloses "The invention uses an array of silicon nitride ribbons, micromachined on top of a silicon substrate using conventional integrated circuit fabrication technology. The ribbons can be deflected under an electrostatic force to form a cylindrical reflector. A thin metal coating, typically aluminum, is deposited on the surface or top of the ribbons for increased reflectivity. Since the required deflection of the ribbon in order to form an effective cylindrical mirror is quite small, the response time is fast and the voltage required to deform the ribbon is low. The high elastic modules of silicon nitride, combined with a very low coefficient of thermal expansion, allows the device to withstand very high incident powers, as encountered in thermal

imaging and laser projection displays. The light valve can be used in "brightfield" or "darkfield" (Schlieren) mode. In summary, the invention uses the fabrication methods developed for grating light valves to build a deformable mirror light valve combining the fabrication and speed advantages of the former with the simplicity of the latter." and "3) A metal coating 2 which can be a highly reflective surface such as a metalized surface such as aluminum surface, on top of ribbon 1 serves both as an electrode and as a reflective layer. A second electrode 5 is deposited at the bottom of airspace 6. Electrodes 2 and 5 form a capacitor. New by applying a voltage 10 between both electrodes, ribbon 1 is deformed due to the electrostatic attraction. The shape of the deformed ribbon can be approximated by a cylindrical surface. A hyperbolic cosine function would be a more accurate representation, but for deflection much smaller than the length of the ribbon the difference between the equations is not significant. ". Also note that the mirrors bend in only one direction, and are longer in one direction than another (see figure 2, element 1).

New light beam 7 is reflected by the coating 2. When the device is not energized most of the reflected light is blocked by stop 8. The stop 8 is a barrier that is not light transmissive. It may be considered as representing a non-transparent area. The narrow slit 9 being transparent area, in stop 8 allows only a small amount of light to go through when there is not energization of the capacitor made up of electrodes 2 and 5. These two elements, the non-transparent area 8 and the transparent area 9 comprise a combination of transparent and non-transparent areas for the change of focus of the incident

light from light beam 7 into a change of intensity of the light. When the device is energized as shown in FIG. 1-b, the cylindrical shape of the ribbon resulting from the relative downward deflection of the mirror surface electrode 2 causes the reflected beam to come to a focus at the slit 9 formed in the barrier and most of the light can pass. It is obvious that if the position of the slit 9 and stop 8 are reversed the device can be used as well. In this case most of the light will pass beyond the stop in the non-energized state. These two modes of operation are sometimes referred to as "darkfield" and "brightfield" respectively

Claims 40, 43, 77-78 are rejected under 35 U.S.C. 102(b) as being anticipated by Zehnpfennig et al 5406412.

The claims are written to :40. An optical apparatus comprising: a variable optical-property mirror having a reflecting surface of a shape wherein the length of one direction is longer than that of the other direction, and said variable optical property mirror is arranged so that the one direction of said reflecting surface coincides with a direction wherein a cross line between said reflecting surface and a plane on which rays incident on and emergent from said variable optical-property mirror lie extends. 43. An optical system, consisting of a rotationally asymmetric surface; and a variable optical-property mirror constructed with a variable shape mirror.

Zehnpfennig et al discloses deformable mirror which is long and skinny (figure 12). Please note the language in the reference " The deformable

wavefront correction mirror 18b, FIG. 12, may consist of a monolithic mirror which can be deformed by actuators 42b, acting typically by way of movable arms 236. The stationary ends of the actuators are anchored to rigid baseplate 36b. The actuators may typically be piezoelectric, electrostrictive, magnetostrictive, or of some other electro-mechanical form. Although thus far wavefront correction mirror 18b is depicted as a monolithic mirror, this is not a necessary limitation of the invention, for the mirror 18c, FIG. 13, may instead be formed of a plurality of smaller mirror elements 240, 242, 244, 246, each of which corresponds to an area approximately three inches square in the entrance pupil, and is supported on typically three actuators 42b on rigid baseplate or beam 36b.". Also note that drive circuits and detectors are shown (cover figure), and present in the following language "here is shown in FIG. 1 a high-resolution synthetic aperture telescope 10 including primary mirror 12 which is formed in the shape of a diametrically centered chordal section of the aperture to be synthesized. Primary mirror 12 may be made of beryllium, aluminum, glass, Pyrex or other conventional materials, and coated with protected aluminum, gold if operation is in infrared range, or any other suitable optical coating. An opening 14 is provided centrally of primary mirror 12 so that incoming light depicted by rays 16 reflected from secondary mirror 18 can pass through to detector assembly 20, which may for example be a CCD array. The telescope rotates about optical axis A-A' in order to produce the set of component images, each corresponding to a separate angular orientation, needed to reconstruct the final image." and elescope system 10 is driven by telescope rotation drive 60, FIG. 4,

operated by controller 62 to rotate smoothly and continuously or in steps, as desired. The position of mirror 12 is sensed by the telescope rotation synch signal circuit 64 which provides a synch signal to memory 66. Memory 66 also stores the input from detector array 20 which has been passed through amplifier 68 and A/D converter 70. From memory 66 each of the component images is delivered to a preprocessing circuit 72, either directly or through a remote data link. The preprocessing circuit for example corrects for the difference in sensitivity between the individual elements or pixels of the detector array 20. Following this a Fourier transform of the component image is generated in Fourier transform circuit 74. A weighting function is applied in weighting circuit 76 to adjust the low spatial frequency data in each component image, after which each of the component images so weighted are co-added together in adder 78 to form a composite Fourier transform. The inverse Fourier transform is then generated in circuit 80 to provide the final high-resolution image of the object as if produced by the full, diffraction limited aperture being synthesized. The output may then be fed to any desired storage or display device such as memory 82, a telemetric output 84, or a local or remote display 86.". Therefore, these claims are anticipated by the reference.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 41-42, 48 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akiyama et al 6522475.

54. An optical apparatus comprising: an image sensor and an optical element; a supporting member for holding said image sensor and said optical element; and another optical element disposed in a vicinity of said supporting member.

> 55. An optical apparatus according to claim 54, wherein said another optical element disposed in the vicinity of said supporting member has a reflecting surface.
> 56. An optical apparatus according to claim 54, wherein said optical apparatus comprises a variable optical-property element.

41. An optical device comprising: a variable optical-property element; and an optical element having a plurality of rotationally asymmetric surfaces and disposed in a vicinity of said variable optical-property element.

> 42. An optical device according to claim 41, further comprising an image sensor.
> 48. An optical device according to 41, wherein each of said variable optical-property mirror and an image sensor is disposed on a surface of said optical element with a plurality of rotationally asymmetric surfaces.

The reference has a variable optical property element (a zoom system) as below shown in the abstract "A zoom optical system comprises a plurality of optical elements. The plurality of optical elements include a first optical element having two refracting surfaces and a plurality of reflecting surfaces formed in a

transparent body, being arranged such that a light beam enters an inside of the transparent body from one of the two refracting surfaces and, after being successively reflected from the plurality of reflecting surfaces, exits from the other of the two refracting surfaces, and/or a second optical element having a plurality of surface mirrors integrally formed and decentered relative to one another, being arranged such that an incident light beam exits therefrom after being successively reflected from reflecting surfaces of the plurality of surface mirrors, and a third optical element composed of a plurality of coaxial refracting surfaces. In the zoom optical system, an image of an object is formed through the plurality of optical elements, and zooming is effected by varying relative positions of at least two optical elements of the plurality of optical elements"

And a plurality of non-rotationally symmetric surfaces are listed "after being successively reflected from the plurality of reflecting surfaces, exits from the other of the two refracting surfaces, and/or a second optical element having a plurality of surface mirrors integrally formed and decentered relative to one another, being arranged such that an incident light beam exits therefrom after being successively reflected from reflecting surfaces of the plurality of surface mirrors, and a third optical element composed of a plurality of coaxial refracting surfaces" . As the zoom system feeds the mirrors, they become a variable optical property mirror as a system. Also, please note, the "Of the plurality of reflecting surfaces, curved reflecting surfaces are all formed to anamorphic shapes", col. 6, last lines. Lacking from the disclosure is a driving circuit.

Drviving circuits were notoriously well known for enabling driving. For example, using a hand crank was out of date and cumbersome, where as a driving circuits enabled compact design with predicable and automated control. Therefore, it would have been obvious to one of ordinary skill o employ a driving circuit for the benefits.

Also lacking is a holder holding the elements. The elements are shown supported by the air, and essentially "floating". Since real objects cannot float, but need to be supported by something, it would have been obvious to employ a holder so the device can be made of known technology.

Claims 37-39, 54-56, 41-42, 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gelbart 6147789.

The claims are written to:

37) an variable optical-property mirror unit comprising: a variable optical-property mirror comprising a rotationally asymmetric reflecting surface of a shape wherein the length of one direction is different from that of the other direction; and a driving circuit constructed and arranged to drive said variable optical-property mirror.

38. A variable optical-property mirror unit according to claim 37, wherein a shape of the reflecting surface of said variable optical-property mirror unit is variable.

39. A variable optical-property mirror unit according to claim 37, wherein the light deflection property of said reflecting surface is rotationally asymmetric.

54. An optical apparatus comprising: an image sensor and an optical element; a supporting member for holding said image sensor and said optical element; and another optical element disposed in a vicinity of said supporting member.

> 55. An optical apparatus according to claim 54, wherein said another optical element disposed in the vicinity of said supporting member has a reflecting surface.
> 56. An optical apparatus according to claim 54, wherein said optical apparatus comprises a variable optical-property element.

41. An optical device comprising: a variable optical-property element; and an optical element having a plurality of rotationally asymmetric surfaces and disposed in a vicinity of said variable optical-property element.

> 42. An optical device according to claim 41, further comprising an image sensor.
> 48. An optical device according to 41, wherein each of said variable optical-property mirror and an image sensor is disposed on a surface of said optical element with a plurality of rotationally asymmetric surfaces.

The reference, Gelbart discloses "The invention uses an array of silicon nitride ribbons, micromachined on top of a silicon substrate using conventional integrated circuit fabrication technology. The ribbons can be deflected under an electrostatic force to form a cylindrical reflector. A thin metal coating, typically aluminum, is deposited on the surface or top of the ribbons for increased reflectivity. Since the required deflection of the ribbon in order to form an effective cylindrical mirror is quite small, the response time is fast and the voltage required to deform the ribbon is low. The high elastic modules of silicon nitride, combined with a very low coefficient of thermal expansion, allows the device to withstand very high incident powers, as encountered in thermal imaging and laser projection displays. The light valve can be used in "brightfield" or "darkfield" (Schlieren) mode. In summary, the invention uses the fabrication

methods developed for grating light valves to build a deformable mirror light valve combining the fabrication and speed advantages of the former with the simplicity of the latter." and "3) A metal coating 2 which can be a highly reflective surface such as a metalized surface such as aluminum surface, on top of ribbon 1 serves both as an electrode and as a reflective layer. A second electrode 5 is deposited at the bottom of airspace 6. Electrodes 2 and 5 form a capacitor. New by applying a voltage 10 between both electrodes, ribbon 1 is deformed due to the electrostatic attraction. The shape of the deformed ribbon can be approximated by a cylindrical surface. A hyperbolic cosine function would be a more accurate representation, but for deflection much smaller than the length of the ribbon the difference between the equations is not significant. ". Also note that the mirrors bend in only one direction, and are longer in one direction than another (see figure 2, element 1).

New light beam 7 is reflected by the coating 2. When the device is not energized most of the reflected light is blocked by stop 8. The stop 8 is a barrier that is not light transmissive. It may be considered as representing a non-transparent area. The narrow slit 9 being transparent area, in stop 8 allows only a small amount of light to go through when there is not energization of the capacitor made up of electrodes 2 and 5. These two elements, the non-transparent area 8 and the transparent area 9 comprise a combination of transparent and non-transparent areas for the change of focus of the incident light from light beam 7 into a change of intensity of the light. When the device is energized as shown in FIG. 1-b, the cylindrical shape of the ribbon resulting from

the relative downward deflection of the mirror surface electrode 2 causes the reflected beam to come to a focus at the slit 9 formed in the barrier and most of the light can pass. It is obvious that if the position of the slit 9 and stop 8 are reversed the device can be used as well. In this case most of the light will pass beyond the stop in the non-energized state. These two modes of operation are sometimes referred to as "darkfield" and "brightfield" respectively

Also lacking is a holder holding the elements. The elements are shown supported by the air, and essentially "floating". Since real objects cannot float, but need to be supported by something, it would have been obvious to employ a holder so the device can be made of known technology.

Claims 37-39, 41-42, 48, 54-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zehnpfennig et al 5406412.

The claims are written to:

37. an variable optical-property mirror unit comprising: a variable optical-property mirror comprising a rotationally asymmetric reflecting surface of a shape wherein the length of one direction is different from that of the other direction; and a driving circuit constructed and arranged to drive said variable optical-property mirror.

41. An optical device comprising: a variable optical-property element; and an optical element having a plurality of rotationally asymmetric surfaces and disposed in a vicinity of said variable optical-property element.

42. An optical device according to claim 41, further comprising an image sensor.

48. An optical device according to 41, wherein each of said variable optical-property mirror and an image sensor is disposed on a surface of said optical element with a plurality of rotationally asymmetric surfaces.

38. A variable optical-property mirror unit according to claim 37, wherein a shape of the reflecting surface of said variable optical-property mirror unit is variable.

39. A variable optical-property mirror unit according to claim 37, wherein the light deflection property of said reflecting surface is rotationally asymmetric.

54. An optical apparatus comprising: an image sensor and an optical element; a supporting member for holding said image sensor and said optical element; and another optical element disposed in a vicinity of said supporting member.

55. An optical apparatus according to claim 54, wherein said another optical element disposed in the vicinity of said supporting member has a reflecting surface.
56. An optical apparatus according to claim 54, wherein said optical apparatus comprises a variable optical-property element.

Zehnpfennig et al discloses deformable mirror which is long and skinny (figure 12). Please note the language in the reference " The deformable wavefront correction mirror 18b, FIG. 12, may consist of a monolithic mirror which can be deformed by actuators 42b, acting typically by way of movable arms 236. The stationary ends of the actuators are anchored to rigid baseplate 36b. The actuators may typically be piezoelectric, electrostrictive, magnetostrictive, or of some other electro-mechanical form. Although thus far wavefront correction mirror 18b is depicted as a monolithic mirror, this is not a necessary limitation of the invention, for the mirror 18c, FIG. 13, may instead be formed of a plurality of smaller mirror elements 240, 242, 244, 246, each of which corresponds to an area approximately three inches square in the entrance pupil,

and is supported on typically three actuators 42b on rigid base plate or beam 36b.". Also note that drive circuits and detectors are shown (cover figure), and present in the following language "here is shown in FIG. 1 a high-resolution synthetic aperture telescope 10 including primary mirror 12 which is formed in the shape of a diametrically centered chordal section of the aperture to be synthesized. Primary mirror 12 may be made of beryllium, aluminum, glass, Pyrex or other conventional materials, and coated with protected aluminum, gold if operation is in infrared range, or any other suitable optical coating. An opening 14 is provided centrally of primary mirror 12 so that incoming light depicted by rays 16 reflected from secondary mirror 18 can pass through to detector assembly 20, which may for example be a CCD array. The telescope rotates about optical axis A-A' in order to produce the set of component images, each corresponding to a separate angular orientation, needed to reconstruct the final image." and elescope system 10 is driven by telescope rotation drive 60, FIG. 4, operated by controller 62 to rotate smoothly and continuously or in steps, as desired. The position of mirror 12 is sensed by the telescope rotation synch signal circuit 64 which provides a synch signal to memory 66. Memory 66 also stores the input from detector array 20 which has been passed through amplifier 68 and A/D converter 70. From memory 66 each of the component images is delivered to a preprocessing circuit 72, either directly or through a remote data link. The preprocessing circuit for example corrects for the difference in sensitivity between the individual elements or pixels of the detector array 20. Following this a Fourier transform of the component image is generated in

Fourier transform circuit 74. A weighting function is applied in weighting circuit 76 to adjust the low spatial frequency data in each component image, after which each of the component images so weighted are co-added together in adder 78 to form a composite Fourier transform. The inverse Fourier transform is then generated in circuit 80 to provide the final high-resolution image of the object as if produced by the full, diffraction limited aperture being synthesized. The output may then be fed to any desired storage or display device such as memory 82, a telemetric output 84, or a local or remote display 86.". Therefore, these claims are anticipated by the reference.

Also lacking is a holder holding the elements. The elements are shown supported by the air, and essentially "floating". Since real objects cannot float, but need to be supported by something, it would have been obvious to employ a holder so the device can be made of known technology.

Election/Restrictions

Newly submitted claims 33, 45, 57-66, 69-76, 84-85 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

1. New Claims 33, 69-71 and 84-85 drawn to an optical system including an image processing circuit, classified in class 250, subclasses 200+.

2. New Claims 57-66 drawn to an optical device having a plurality of variable reflecting devices on the same optical path perfoming a zooming function, classified in class 359, subclass .

3. All originally drawn to an optical mirror which is variable and employes a rotationally assymmetric shape, classified in class 359, subclass 263.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and III are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention with image processing has separate utility such as in a device without a variable reflecting surface or non-spherical surface. See MPEP § 806.05(d).

Inventions II and III are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention with device of group III can be used with only a single variable reflector, and the variable reflector without the details of group III can be employed. See MPEP § 806.05(d).

Note: The focus of the invention was previously a variable mirror having the detail of the surface being deforming. The element was claimed in

combination with generic elements, which were so generic as to require no search. As applicant adds different system components, each system component with non-generic detail comes out with a completely different classification, requiring a completely different search. Although these claims were presented before, applicant has amended them significantly, with several claims applicant deleted the entire body of the claim and replaced the body with a completely new claim. The burdon with each of these are significant- in fact, each independent claim has substantially a search in a completely different area unrelated to the searches for the other independent claims.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 33, 45, 57-66, 69-76, 84-85 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Withdrawn claims:

33. An optical apparatus comprising: an optical system for forming an object image, said optical system comprising a variable optical-property element; an image sensor constructed and arranged to image said object image; and an image processing device constructed and arranged to perform an image processing using an image data obtained by said image sensor, said image processing device comprising a process for carrying out a process for modifying

said image data in response to a change of light deflective action of said variable optical-property element.

45. An optical system, comprising: an optical element having a rotationally asymmetric surface; and a variable optical-property mirror unit comprising a variable optical-property mirror, an image sensor disposed at a position of an image formed by said image sensor and said variable optical-property mirror, and a holding member supporting both of said variable optical-property mirror and said image sensor.

> 85. An optical system according to claim 45, wherein said variable optical property mirror is constructed with a variable shape mirror.

57. An optical apparatus, comprising: an optical system having a plurality of reflecting-type variable optical-property elements and having a zooming function or a focusing function, and said variable optical property elements being arranged on a same optical path.

69. An optical apparatus, comprising: a variable focal-length optical system comprising a reflecting-type variable optical property element; an image sensor disposed at the position of an image formed by said variable focal length optical system; and a display element constructed and arranged to display an image based on an output from said image sensor.

> 70. An apparatus according to claim 69, further comprising an optical element.
> 71. An apparatus according to claim 69, further comprising a lens.
> 73. An apparatus according to claim 69, wherein a stop is disposed in said variable focal-length optical system.

72. An imaging apparatus, comprising: a variable focal-length optical system comprising an infrared cutoff filter or a low-pass filter and a reflecting-type variable optical property element; an image sensor disposed at the position of an image formed by said optical system; and a display element constructed and arranged to display an image based on an output from said image sensor.

84. An optical apparatus, comprising: an optical system constructed and arranged to form an object image, said optical system comprising a variable optical-property element; an image sensor constructed and arranged to image said object image; and a signal processing circuit constructed and arranged to process an image signal obtained by said image sensor, said signal processing circuit comprising a circuit for carrying out a process modifying said image signal in response to a change of light deflective action of said variable optical property element.

Response to Arguments

Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection. Applicant argues that the claims as amended are allowable, however they are realistically still generic, and read on directly or are obvious over references to numerous to mention- in fact many read directly on numerous old references of applicant. Some claims simply listi pairs of commonly employed optical element, many without any relation between the optical elements.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth A Parker whose telephone number is 703-305-6202. The examiner can normally be reached on 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on 305-3492. The fax phone numbers for the organization where this application or proceeding is

assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-0956.

Kenneth A Parker
Primary Examiner
Art Unit 2871

July 28, 2003